In the Claims:

The claims are as follows:

1. (Original) A method for optimising computer software that includes one or more call statements and a procedure which is callable by the or each call statement and which has two or more code branches and control flow code for directing program flow to the code branches, the method comprising the steps of:

    (a)   analysing the procedure to identify said control flow code and said code branches;

    (b)   identifying for each said code branch a new procedure containing the respective code branch;

    (c)   recording a list of data entries corresponding to the respective new procedures, each entry comprising a data item identifying the respective new procedure and a data item representative of the branch conditions under which said control flow code directs program flow to the associated code branch;

    (d)   for the or each call statement, scanning the entries in said list to determine one for which there is correspondence between said branch conditions and call parameters directed to said control flow code by the call statement and modifying the call statement to replace the call to the original procedure by a call to the corresponding new procedure.

2. (Original) A method according to Claim 1, wherein step (a) comprises constructing a control flow graph for the procedure, the control flow graph comprising a branching node representative of said control flow code and further nodes representing respective ones of said code branches.

09/704,649   2

3. (Original) A method according to Claim 1, wherein one or more of said code branches each itself comprises two or more code branches and an item of control flow code for directing program flow to those code branches and wherein between said steps (a) and (b), said method comprises the further steps of:

(e)   for each item of control flow code, before identifying any new procedure in accordance with step (b) of the method, checking for compliance between one or more predetermined rules for the software and the software should step (b) and following steps of the method take place; and

(f)   for that item of control flow code, continuing with step (b) and the following steps of the method only in the event of such compliance.

4. (Original) A method according to Claim 3, wherein step (e) comprises the application of a cost-analysis algorithm based on predetermined rules about the length of the software.

5. (Original) A method according to Claim 1, including optimising the or each new procedure for which a call parameter is a constant by propagating that constant through the new procedure.

6. (Original) A method according to Claim 1, including analysing a call statement, calling parameters and an associated new procedure to determine if they are compliant with predetermined in-lining rules and, if they are so compliant, replacing said call statement by a copy of the new procedure.

7. (Original) A method for optimising computer software that includes one or more call statements and a procedure which is callable by the or each call statement, the method comprising the steps of:

(a)   constructing a control flow graph for the procedure, the control flow graph comprising one or more branching nodes each representative of respective control flow code and,

09/704,649   3

for each branching node, two or more further nodes representing respective code branches to which program flow is directed by the branching node;

(b) considering each node in turn and, if the node being considered is a branching node and if the branching condition for that node by which the respective control flow code directs program flow to the respective code branches is able to be represented as a function only of formal parameters and global variables, identifying a new procedure for which the flow control graph comprises all the nodes in the path from the first node of the procedure to the node being considered, the node being considered, and the whole of the portion of the control flow graph led to directly or indirectly from the node being considered;

(c) recording a list of data entries corresponding to the respective new procedures, each entry comprising a data item identifying the respective new procedure and a data item representative of the corresponding branching condition;

(d) for each said call statement, scanning the entries in said list to determine one for which there is correspondence between said branch condition and call parameters supplied by the call statement; and

(e) modifying the call statements to call said new procedures.

8. (Original) A computer system for optimising computer software that includes one or more call statements and a procedure which is callable by the or each call statement and which has two or more code branches and control flow code for directing program flow to the code branches, the system comprising:

(i) analysing means for analysing the procedure to identify said control flow code and said code branches;

(ii) identifying means for identifying for each said code branch a new procedure containing the respective code branch;

(iii) recording means for recording a list of data entries corresponding to the respective new procedures, each entry comprising a data item identifying the respective new procedure and a data item representative of the branch conditions under which said control flow code directs program flow to the associated code branch;

09/704,649   4

(iv)   scanning means operable, for each said call statement, for scanning the entries in said list to determine one for which there is correspondence between said branch conditions and call parameters supplied by the call statement; and

(v)   modifying means for modifying the call statement to call the corresponding new procedure.

9. (Original) A system according to Claim 8, wherein said analysing means is operable for storing data representing the nodes and edges of a control flow graph for the procedure, said nodes including a branching node representative of said control flow code and further nodes representative of respective ones of said code branches.

10. (Original) A system according to Claim 8, wherein one or more of said code branches each itself comprises two or more code branches and an item of control flow code for directing program flow to those code branches and wherein the system comprises checking means which is operable to check for compliance between one or more predetermined rules for the software and the software should said identifying means identify any new procedure.

11. (Original) A system according to Claim 10, wherein said checking means is operable for checking compliance with a cost-analysis algorithm based on predetermined rules about the length of the software.

12. (Original) A system according to Claim 8, including means for optimising the or each new procedure for which a call parameter is a constant by propagating that constant through the new procedure.

13. (Original) A system according to Claim 8, including means for analysing a call statement, calling parameters and an associated new procedure to determine if they are compliant with predetermined related to in-lining and, if they are so compliant, replacing said call statement by a copy of the new procedure.

14. (Original) A system for optimising computer software that includes one or more call statements and a procedure which is callable by the or each call statement, the system comprising:

(i)   means for storing data representing a control flow graph for the procedure, the control flow graph comprising one or more branching nodes each representative of respective control flow code and, for each branching node, two or more further nodes representing respective code branches to which program flow is directed by the branching node;

(ii)   means for traversing the control flow graph to consider each node in turn and, if the node being considered is a branching node and if the branching condition for that node by which the respective control flow code directs program flow to the respective code branches is able to be represented as a function only of formal parameters and global variables, identifying a new procedure for which the flow control graph comprises all the nodes in the path from the first node of the procedure to the node being considered, the node being considered, and the whole of the portion of the control flow graph led to directly or indirectly from the node being considered;

(iii)   means for recording a list of data entries corresponding to the respective new procedures, each entry comprising a data item identifying the respective new procedure and a data item representative of the corresponding branching condition;

(iv)   means for scanning the entries in said list to determine for each call statement, an entry for which there is correspondence between said branch condition and call parameters supplied by the call statement; and

(v)   means for modifying the call statements to call said new procedures.

15. (Original) A computer program product for optimising computer software that includes one or more call statements and a procedure which is callable by the or each call statement and which has two or more code branches and control flow code for directing program flow to the code branches, said program product comprising computer code which includes:

(i)   a first computer code portion for analysing the procedure to identify said control flow code and said code branches;

(ii)   a second computer code portion for identifying for each said code branch a new

09/704,649   6

procedure containing the respective code branch;

(iii)   a third computer code portion for recording a list of data entries corresponding to the respective new procedures, each entry comprising a data item identifying the respective new procedure and a data item representative of the branch conditions under which said control flow code directs program flow to the associated code branch;

(iv)   a fourth computer code portion operable, for each said call statement, for scanning the entries in said list to determine one for which there is correspondence between said branch conditions and call parameters supplied by the call statement; and

(v)   a fifth computer code portion for modifying the call statement to call the corresponding new procedure.

16. (Original) A program product according to Claim 15, implemented in the form of a machine readable storage medium storing said computer code.

17. (Original) A program product according to Claim 16, implemented in the form of a body of computer code made available for downloading from a computer connected to a computer network.

18. (Original) A computer program product for optimising computer software that includes one or more call statements and a procedure which is callable by the or each call statement, said program product comprising computer code which includes:

(i)   a first code portion for storing data representing a control flow graph for the procedure, the control flow graph comprising one or more branching nodes each representative of respective control flow code and, for each branching node, two or more further nodes representing respective code branches to which program flow is directed by the branching node;

(ii)   a second code portion for traversing the control flow graph to consider each node in turn and, if the node being considered is a branching node and if the branching condition for that node by which the respective control flow code directs program flow to the respective code branches is able to be represented as a function only of formal parameters and global variables,

09/704,649

7

identifying a new procedure for which the flow control graph comprises all the nodes in the path from the first node of the procedure to the node being considered, the node being considered, and the whole of the portion of the control flow graph led to directly or indirectly from the node being considered;

(iii)   a third code portion for recording a list of data entries corresponding to the respective new procedures, each entry comprising a data item identifying the respective new procedure and a data item representative of the corresponding branching condition;

(iv)   a fourth code portion operable, for each said call statement, for scanning the entries in said list to determine one for which there is correspondence between said branch condition and call parameters supplied by the call statement; and

(v)   a fifth code portion for modifying the call statements to call said new procedures.

19. (Original) A program product according to Claim 18, implemented in the form of a machine readable storage medium storing said computer code.

20. (Original) A program product according to Claim 18, implemented in the form of a body of computer code made available for downloading from a computer connected to a computer network.

09/704,649   8